

F-band, High-Efficiency GaN Power Amplifier for the Scanning Microwave Limb Sounder and SOFIA, Phase II

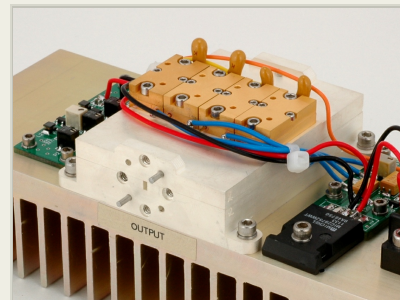
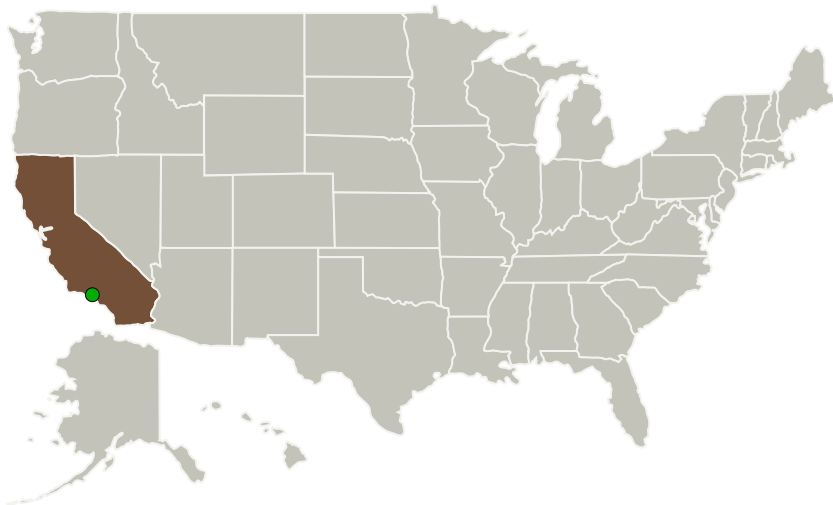
Completed Technology Project (2014 - 2017)



Project Introduction

QuinStar Technology proposes to develop a high-efficiency, 4-W SSPA operating at F-band frequencies (106-114 GHz). This will be achieved by employing two major innovations. Firstly, we are employing state-of-the-art wide bandgap GaN (Gallium Nitride) devices. At millimeter-wave frequencies, these GaN devices have demonstrated power densities of 5 to 8 times higher than GaAs or InP devices. Further, we are proposing to operate these devices in a quasi-switching mode, which has demonstrated, in Phase I simulations, drain efficiencies approaching 70%. The resulting MMIC, operating over the 106 to 114 GHz band, will produce an output power of one watt and an efficiency of greater than 33%. Secondly, we are proposing to utilize a new low loss, H-tee combining approach to combine 4 of these high-efficiency chips to achieve 4 watts. The net result is a unique combination of high performance devices and innovative power combining. We anticipate that this work will result in an order of magnitude increase in the state-of-the-art of SSPA output power and efficiency at F-band. We anticipate that this work will be very important for NASA's Earth Science missions and for DoD W-band radar and communications applications.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Quinstar Technology, Inc	Lead Organization	Industry Small Disadvantaged Business (SDB)	Torrance, California
● Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California

Primary U.S. Work Locations

California

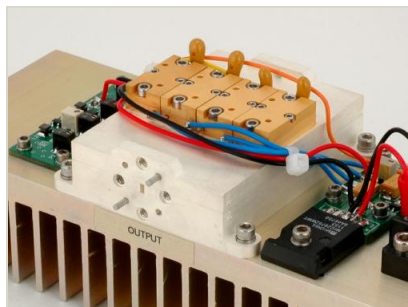
Project Transitions

**April 2014:** Project Start**December 2017:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/137595>)

Images



Briefing Chart Image

F-band, High-Efficiency GaN Power Amplifier for the Scanning Microwave Limb Sounder and SOFIA, Phase II
(<https://techport.nasa.gov/image/132107>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Quinstar Technology, Inc

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

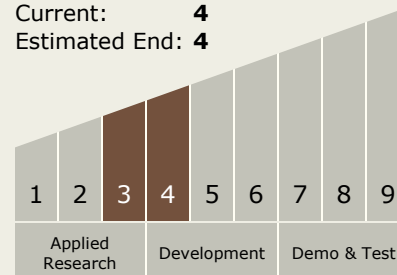
Program Manager:

Carlos Torrez

Principal Investigator:

Edmar Camargo

Technology Maturity (TRL)

Start: **3**Current: **4**Estimated End: **4**

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Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.1 Remote Sensing Instruments/Sensors
 - └ TX08.1.4 Microwave, Millimeter-, and Submillimeter-Waves

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System